

Trend Study 22-6-03

Study site name: Beaver Table.

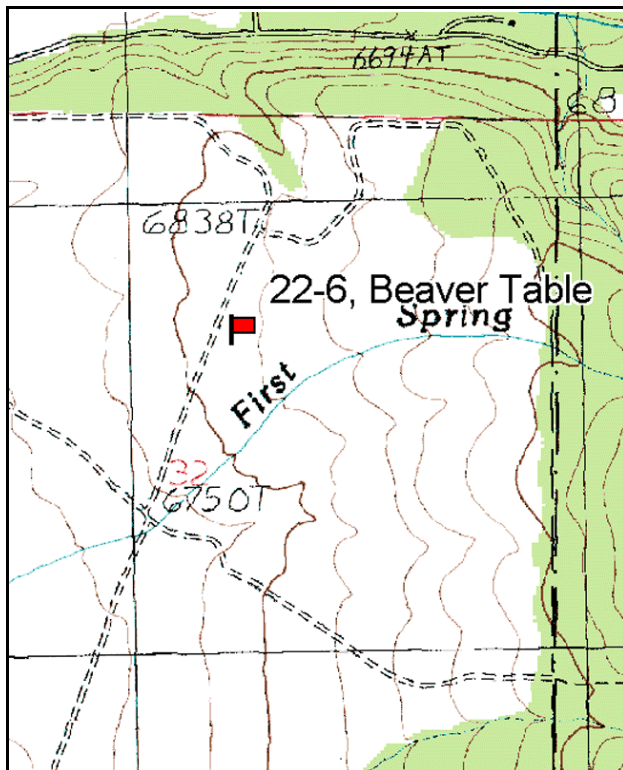
Vegetation type: Cabled, Seeded P-J.

Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 5 on 2ft.

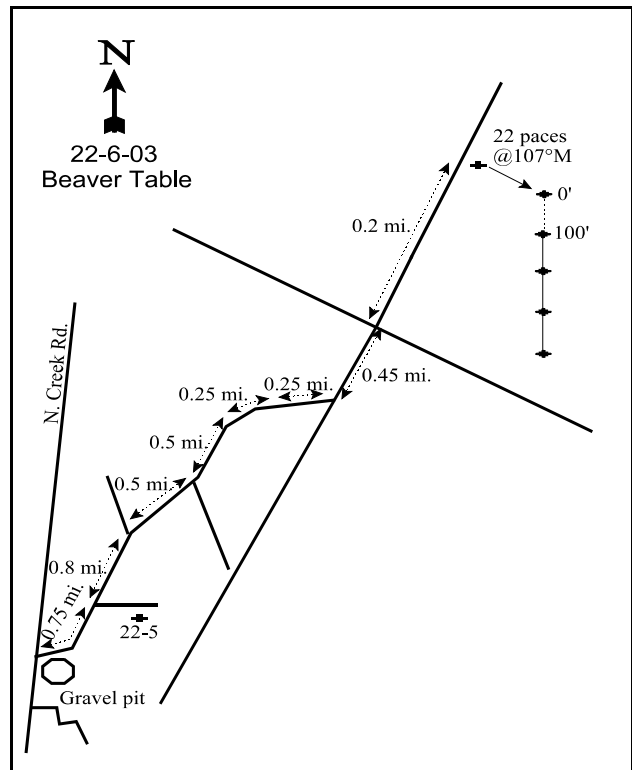
LOCATION DESCRIPTION

From the corner of North Creek Road and SR 153 in Beaver, go north 1.95 miles to a gravel pit on the right. On the south side of the gravel pit a good dirt road goes northeast up the bottom of a draw. Drive up this road 0.75 miles to a fork, go straight (right fork goes to Bone Hollow transect). Continue 0.8 miles to a fork and turn right through the fence. Go 0.5 miles to another fork, then go straight heading north then east 0.5 miles to a fence. Continue east past the fence 0.25 miles to another fenceline with a fork just beyond it. Go straight (east) another 0.25 miles to a junction with a road going north-south, then turn left (north). Go 0.45 miles to a junction with a road going east-west. Continue north 0.2 miles to a witness post on the right. From the witness post walk 22 paces at 107 degrees magnetic. The 0-foot stake is marked by rebar tagged #7049.



Map Name: Beaver

Township 28S, Range 6W, Section 32



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4243683 N, 364222 E

DISCUSSION

Beaver Table - Trend Study No. 22-6

The Beaver Table trend study is located on a bench at the foot of the Tushar Mountains northeast of Beaver. This area is recognized as critical range to wintering deer, especially since completion of I-15 has restricted movement to the extensive historical winter ranges west of the interstate. The study is in the center of a Division of Wildlife Resources owned section, which was cabled and seeded in 1957. The general terrain is a long gentle slope (3-5%) with a western aspect at an elevation of 6,800 feet. The vegetative community is dominated by Wyoming big sagebrush and scattered bitterbrush and juniper. Cattle grazing was not authorized in the area in the past, although a few cattle pats were sampled in the pellet group transect in 2003. A DWR pellet group transect is located near the trend study site. It showed an average of 40 deer days use/acre (99 ddu/ha) between 1981 and 1985 (Jense et al. 1985). Through the winter of 1990-91, the average was even higher at 56 deer days use/acre (138 ddu/ha) (Jense et al. 1991). Between 1993 and 1997, deer use averaged 18 days use/acre (44 ddu/ha) (Evans et al. 1997). A pellet group transect read on the trend study site in 1998 and 2003 estimated 47 deer days use/acre (116 ddu/ha) and 71 deer days use/acre (175 ddu/ha) respectively. A buck and doe were bedded down on the site in 2003.

Soils are alluvially deposited and have good depth with an average effective rooting depth of 17 inches. Textural and chemical analysis indicates a clay soil with a neutral pH (6.6). There is a lime cemented hardpan approximately 2 feet below the surface, which could limit rooting depth. A number of large rocks from basaltic parent material are found throughout the soil profile. There is also a concentration of rocks and pavement on and near the soil surface. Good litter and vegetation cover and the gentle slope moderates the hazard of severe soil erosion. In 2003, both litter and vegetation cover declined due mostly to the decrease in cheatgrass with the dry conditions. Some overland water movement was apparent near the end of the transect prior to the 2003 reading. Pedestalling is moderate around sagebrush stems and soil movement was noticeable. An erosion condition class assessment rated soils as stable to slightly eroding in 2003.

The dominant and key browse species is Wyoming big sagebrush. Density was estimated at 5,420 plants/acre in 1998 and 5,740 in 2003. The relatively large decrease in sagebrush density from 1991 to 1998 can be partially explained by number of dead plants in the population. However, the majority of the change is because of the larger sample used in 1998 which gives more accurate estimates for browse populations with clumped and/or discontinuous distributions. Recruitment by young plants was very low in both 1998 and 2003. This population is best categorized as overly mature with a moderate to high rate of decadence. Percent decadence was very high in 1991 and 1998 (53% and 48%), but more moderate in 1985 and 2003 (26% and 31%). Nearly one-fourth of the population was classified as decadent and dying in 1998 and 2003. Utilization has been consistent over all years with most plants showing light to moderate use. Plants displaying poor vigor has also been relatively consistent over all years (7-16%). Annual leader growth on big sagebrush averaged 1.7 inches in 2003. Although less abundant, antelope bitterbrush provides additional forage on this site. It is a highly preferred species by deer and has been moderately to heavily hedged in all readings. Bitterbrush density was estimated at 780 plants/acre in 1998 and 600 in 2003. Browsing intensity does not seem to have adversely effected bitterbrush vigor. Recruitment by young plants was high in 1991 and 1998, but no young were sampled in 2003. Annual leader growth on bitterbrush averaged 2.7 inches in 2003.

Young Utah juniper trees are scattered over the area and show signs of reinvasion in the upper end of the treated section. Point-center quarter data from 2003 estimated 95 juniper trees/acre. Broom snakeweed, an undesirable increaser, shows high fluctuations in density between all years. Density was estimated between 7,000 and 8,000 plants/acre in 1985 and 1998, but only 1,000 to 2,000 plants/acre in 1991 and 2003. It is interesting to note that the two lower density estimates occurred during periods of drought. This high fluctuation in snakeweed density is typical for areas that have experienced periods of drought followed by years with normal or above normal precipitation.

Cheatgrass dominated the understory in 1998 by contributing 56% of the herbaceous understory cover and 27% of the total vegetation cover on the site. Cheatgrass was sampled in 99 out of 100 quadrats and had a nested frequency of 345 out of a possible 400. With drought conditions in 2003, cheatgrass significantly declined in nested frequency and average cover and was sampled in only 38% of the quadrats. Bottlebrush squirreltail has been the most abundant perennial species in all surveys, but has steadily declined in frequency since 1991. Indian ricegrass, muttongrass, and bluebunch wheatgrass occur rather sporadically, but enough to provide some forage. The grasses are vigorous and currently not utilized. A variety of forbs have been sampled on the site as well. Seventeen species of forbs were sampled in 1998 and 23 in 2003. Several important perennial forbs that have been sampled include lobeleaf groundsel, longleaf phlox, and sulfur eriogonum. Annual species are present but limited.

1985 APPARENT TREND ASSESSMENT

As herbaceous vegetation and litter cover increase, soil condition will improve. With the apparent increase in grasses and forbs, vegetative trend appears upward for the time being. However, snakeweed and juniper appear to be slowly increasing in this area. Since deer use appears to be increasing, the added pressure on the more palatable species may favor these invaders and accelerate their invasion into the community. Chaining and seeding projects similar to this one could be done in adjacent areas and alleviate some of the browsing pressure to maintain the range in good condition for a longer period.

1991 TREND ASSESSMENT

Soil trend is slightly down because basal vegetation and litter cover are slightly lower than 1985, and bare ground increased to 32%. Browse trend is also slightly downward. Wyoming big sagebrush density increased due to the abundance of young plants in 1985, but percent decadence has also increased to 53%. The young age class declined significantly in 1991. Broom snakeweed decreased by 84%. A positive for this site is the increase of bitterbrush density and the abundance of young plants in the population. Trend for the herbaceous understory is stable. Sum of nested frequency values for perennials remained stable since 1985.

TREND ASSESSMENT

soil - slightly down (2)

browse - slightly down (2)

herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Soil trend is slightly upward. Percent bare ground cover has declined while percent litter cover has increased. Some erosion is apparent near the end of the transect, but this is not accelerated and more of the soil is becoming protected from erosion. Much of the litter is fine fuels, provided chiefly from the cheatgrass, and could carry a fire throughout the site. The browse trend is slightly down. Percent decadence in the Wyoming big sagebrush population remains very high at 48%. A disturbing element of the Wyoming big sagebrush population is the increase in the percentage of decadent plants classified as dying and the continued decline in the number of young plants. If this trend continues, the population will decline. The herbaceous understory is slightly downward. Perennial grasses, the important component of the herbaceous understory on this site, shows a slow, but consistent decline in sum of nested frequency over all years.

TREND ASSESSMENT

soil - slightly up (4)

browse - slightly down (2)

herbaceous understory - slightly down (2)

2003 TREND ASSESSMENT

Soil trend is down. Vegetation and litter cover show large declines, while bare ground cover doubled. Soil movement was evident in 2003 but not severe. Trend for browse is stable. Wyoming big sagebrush has a decreased rate of decadence, but the proportion of decadent plants classified as dying remained nearly the same as in 1998. Young plants make up only 1% of the population. Use remains moderate and vigor is generally normal throughout the population. Bitterbrush shows a slight decline in population density and increased decadence. Trend for the herbaceous understory is slightly down. Perennial grasses continue to decline in sum of nested frequency. Bottlebrush squirreltail, Indian ricegrass, and bluebunch wheatgrass all have lower nested frequency values since 1998. A slight increase in perennial forb sum of nested frequency is a positive sign especially during the current drought period. However, forbs combine to provide only 1% total cover.

TREND ASSESSMENT

soil - down (1)

browse - stable (3)

herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --

Management unit 22 , Study no: 6

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	-	-	1	3	.00	.03
G	Agropyron spicatum	a-	a-	b ¹⁴	a ⁵	.44	.01
G	Bromus japonicus (a)	-	-	4	5	.03	.01
G	Bromus tectorum (a)	-	-	b ³⁴⁵	a ⁸⁰	11.17	.61
G	Oryzopsis hymenoides	a ³⁵	a ²⁴	b ⁵⁰	ab ³⁴	2.58	1.09
G	Poa fendleriana	20	17	19	38	.71	.56
G	Poa pratensis	-	-	1	2	.03	.03
G	Sitanion hystrix	c ¹⁸²	c ¹⁸⁰	b ¹¹⁴	a ⁶¹	3.65	1.26
G	Stipa lettermani	1	3	-	-	-	-
Total for Annual Grasses		0	0	349	85	11.20	0.62
Total for Perennial Grasses		238	224	199	143	7.42	3.00
Total for Grasses		238	224	548	228	18.62	3.62
F	Agoseris glauca	-	-	7	4	.01	.01
F	Alyssum alyssoides (a)	-	-	5	8	.01	.03
F	Antennaria rosea	-	-	6	1	.04	.00
F	Arabis demissa	ab ¹⁵	b ²⁷	a ⁶	a ³	.01	.01
F	Astragalus convallarius	ab ³	a-	b ⁸	ab ⁴	.15	.06
F	Astragalus spp.	-	-	4	-	.03	-
F	Castilleja chromosa	-	6	-	-	.00	-
F	Calochortus nuttallii	a ²	a-	a-	b ¹⁵	-	.06

T y p e	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
F	Chaenactis douglasii	_b 35	_b 33	_a 6	_a 1	.04	.00
F	Cymopterus spp.	4	-	-	6	-	.01
F	Descurainia pinnata (a)	-	-	-	1	-	.00
F	Epilobium brachycarpum (a)	-	-	_b 31	_a 10	.09	.02
F	Erigeron spp.	-	-	-	1	-	.00
F	Eriogonum shockleyi	-	-	-	6	-	.03
F	Eriogonum umbellatum	3	2	6	3	.06	.01
F	Gayophytum ramosissimum(a)	-	-	-	6	-	.05
F	Gilia spp. (a)	-	-	-	6	-	.02
F	Lappula occidentalis (a)	-	-	-	1	-	.00
F	Lactuca serriola	-	-	2	-	.00	-
F	Lotus utahensis	-	-	1	2	.00	.01
F	Machaeranthera canescens	_{ab} 3	_a -	_b 10	_a -	.17	-
F	Penstemon spp.	-	-	1	-	.03	-
F	Phlox longifolia	_a 17	_b 42	_{ab} 41	_b 52	.15	.18
F	Polygonum douglasii (a)	-	-	_a 9	_b 24	.02	.05
F	Ranunculus testiculatus (a)	-	-	-	2	-	.01
F	Senecio multilobatus	24	7	12	21	.07	.07
F	Sphaeralcea coccinea	29	24	22	22	.30	.25
F	Trifolium spp.	_a -	_a -	_a -	_b 9	-	.07
Total for Annual Forbs		0	0	45	58	0.12	0.19
Total for Perennial Forbs		135	141	132	150	1.10	0.81
Total for Forbs		135	141	177	208	1.22	1.00

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --

Management unit 22 , Study no: 6

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Artemisia tridentata wyomingensis	90	88	13.81	17.86
B	Gutierrezia sarothrae	61	32	4.11	.36
B	Juniperus osteosperma	3	3	.78	1.37
B	Pinus edulis	1	2	-	-
B	Purshia tridentata	30	23	3.14	4.05
B	Ribes cereum cereum	1	0	-	-
Total for Browse		186	148	21.86	23.65

CANOPY COVER, LINE INTERCEPT --

Management unit 22 , Study no: 6

Species	Percent Cover	
	'98	'03
Artemisia tridentata wyomingensis	-	18.85
Gutierrezia sarothrae	-	.10
Juniperus osteosperma	.60	1.39
Purshia tridentata	-	2.83

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 22 , Study no: 6

Species	Average leader growth (in)
	'03
Artemisia tridentata wyomingensis	1.7
Purshia tridentata	2.7

POINT-QUARTER TREE DATA --

Management unit 22 , Study no: 6

Species	Trees per Acre	
	'98	'03
Juniperus osteosperma	107	95

Average diameter (in)	
'98	'03
5.0	4.6

BASIC COVER --

Management unit 22 , Study no: 6

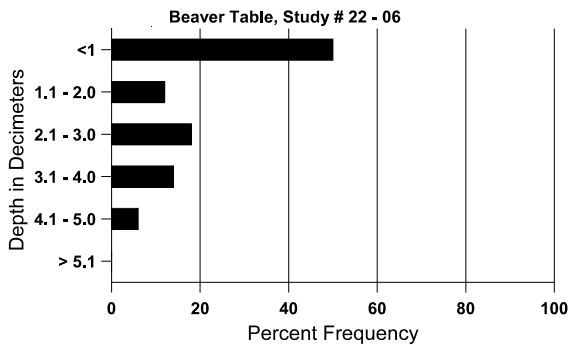
Cover Type	Average Cover %			
	'85	'91	'98	'03
Vegetation	6.50	5.25	41.77	28.00
Rock	14.50	10.25	9.70	8.77
Pavement	11.50	12.25	11.98	6.87
Litter	40.75	39.25	47.04	33.61
Cryptogams	.25	.75	.02	.81
Bare Ground	26.50	32.25	18.15	37.97

SOIL ANALYSIS DATA --

Management unit 22, Study no: 6, Study Name: Beaver Table

Effective rooting depth (in)	Temp °F (depth)	pH	% sand	% silt	% clay	% OM	PPM P	PPM K	ds/m
17.1	64.0 (16.4)	6.6	36.7	22.7	40.6	2.2	10.6	73.6	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 22 , Study no: 6

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	39	6	-	-
Cow	-	-	-	2 (5)
Deer	43	31	47 (116)	71 (175)

BROWSE CHARACTERISTICS --

Management unit 22 , Study no: 6

		Age class distribution (plants per acre)					Utilization				
Y e a r	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
<i>Artemisia tridentata wyomingensis</i>											
85	8333	266	2133	4000	2200	-	49	2	26	11	15/20
91	9999	-	400	4266	5333	-	33	19	53	16	17/26
98	5420	20	100	2740	2580	1380	43	8	48	13	19/26
03	5740	-	20	3940	1780	1180	49	8	31	7	20/26
<i>Gutierrezia sarothrae</i>											
85	7266	2333	2800	4466	-	-	0	0	0	0	9/8
91	1132	-	66	733	333	-	0	0	29	6	9/6
98	7640	360	2400	5240	-	-	0	0	0	0	13/11
03	1600	60	420	1080	100	700	0	0	6	0	7/6
<i>Juniperus osteosperma</i>											
85	199	200	66	133	-	-	0	0	-	0	69/45
91	199	-	66	133	-	-	0	0	-	0	78/68
98	60	20	20	40	-	-	0	0	-	0	-/-
03	60	-	-	60	-	-	0	0	-	0	-/-
<i>Leptodactylon pungens</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	-	0	-/-
03	0	-	-	-	-	-	0	0	-	0	5/3
<i>Opuntia spp.</i>											
85	133	-	-	133	-	-	0	0	0	0	5/12
91	465	-	333	66	66	-	14	14	14	43	4/6
98	0	-	-	-	-	-	0	0	0	0	7/19
03	0	-	-	-	-	-	0	0	0	0	6/9
<i>Pinus edulis</i>											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	20	20	20	-	-	-	0	0	-	0	-/-
03	40	-	40	-	-	-	0	0	-	0	-/-
<i>Purshia tridentata</i>											
85	866	-	133	733	-	-	38	62	0	0	22/11
91	1265	-	866	133	266	-	58	26	21	11	33/53
98	780	40	300	480	-	-	36	18	0	0	27/46
03	600	-	-	440	160	20	10	83	27	13	27/36

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Ribes cereum cereum											
85	0	-	-	-	-	-	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	-	0	-/-
98	100	-	-	100	-	-	0	0	-	0	12/16
03	0	-	-	-	-	-	0	0	-	0	-/-